CLAIMS

What is Claimed is:

1. A fuel cell distribution system for controlling power being applied to a system load, said system comprising:

a fuel cell, said fuel cell generating a draw current;

a power conditioning module responsive to the draw current, said power conditioning module conditioning the draw current and applying the conditioned draw current to the system load;

a fuel cell sensor, said fuel cell sensor measuring the draw current from the fuel cell and generating a fuel cell signal indicative of the measured draw current; and

a fuel cell controller responsive to the fuel cell signal, said fuel cell controller operating a load following algorithm that defines a command signal applied to the fuel cell that sets the available output power from the fuel cell, said load following algorithm also defining a maximum current draw signal applied to the power conditioning module that defines a maximum draw current to be drawn from the fuel cell.

2. The system according to claim 1 wherein the load following algorithm defines an approach threshold region, and wherein the fuel cell controller increases the available output power by the command signal if the draw current enters the approach threshold region.

3. The system according to claim 2 wherein the load following algorithm maintains the available output power constant by the command signal if the draw current leaves the approach threshold region.

4. The system according to claim 1 wherein the load following algorithm defines a diverge threshold region, and wherein the fuel cell controller

decreases the available output power by the command signal if the draw current enters the diverge threshold region.

5. The system according to claim 4 wherein the load following algorithm maintains the available output power constant by the command signal if the draw current leaves the diverge threshold region.

6. The system according to claim 1 further comprising a battery and a battery current sensor, said battery providing battery current for the system load and said battery current sensor measuring the battery current, said battery current sensor generating a battery current signal indicative of the measured battery current.

7. The system according to claim 6 wherein the fuel cell controller is responsive to the battery current signal, said fuel cell controller increasing the available output power if the battery sensor measures a predetermined battery current continuously for a predetermined period of time.

8. The system according to claim 1 further comprising a battery and a battery voltage sensor, said battery providing battery voltage for the system load and said battery voltage sensor measuring the battery voltage, said battery voltage sensor generating a battery voltage signal indicative of the measured battery voltage.

9. The system according to claim 8 wherein the fuel cell controller is responsive to the battery voltage signal, said fuel cell controller monitoring battery voltage drift and determining a charge current applied to the battery by increasing the power generated by the fuel cell.

10. The system according to claim 1 wherein the system provides power to a vehicle.

11. The system according to claim 1 wherein the system is part of a vehicle control system that follows unmeasured loads in a vehicle.

12. The system according to claim 11 wherein the unmeasured loads are from a vehicle heating ventilation and air conditioning system.

13. A fuel cell distribution system for controlling power being applied to a system load, said system comprising:

a fuel cell, said fuel cell generating a draw current;

a battery, said battery generating a battery current;

a power conditioning module responsive to the draw current and the battery current, said power conditioning module conditioning the draw current and the battery current and applying the conditioned draw current and battery current to the system load;

a fuel cell sensor, said fuel cell sensor measuring the draw current from the fuel cell and generating a fuel cell signal indicative of the measured draw current; and

a fuel cell controller responsive to the fuel cell signal, said fuel cell controller operating a load following algorithm that defines a command signal applied to the fuel cell that sets the available output power from the fuel cell, said load following algorithm also defining a maximum draw current signal applied to the power conditioning module that defines a maximum draw current to be drawn from the fuel cell, said load following algorithm defining an approach threshold region, wherein the fuel cell controller increases the available output power by the command signal if the draw current enters the approach threshold region, and wherein the load following algorithm maintains the available output power constant by the command signal if the draw current leaves the approach threshold region, said load following algorithm also defining a diverge threshold region, wherein the fuel cell controller decreases the available output power by the command signal if the draw current enters the diverge threshold region, and wherein the load following algorithm maintains the available output power

constant by the command signal if the draw current leaves the diverge threshold region.

14. The system according to claim 13 further comprising a battery current sensor, said battery current sensor measuring the battery current, said battery current sensor generating a battery current signal indicative of the measured battery current, wherein the fuel cell controller is responsive to the battery current signal, said fuel cell controller increasing the available output power if the battery sensor measures a predetermined battery current continuously for a predetermined period of time.

15. The system according to claim 13 further comprising a battery voltage sensor, said battery voltage sensor measuring the battery voltage, said battery voltage sensor generating a battery voltage signal indicative of the measured battery voltage, wherein the fuel cell controller is responsive to the battery voltage signal, said fuel cell controller monitoring battery voltage drift and controlling a charge current applied to the battery.

16. A method for distributing power from a fuel cell to a load, said method comprising:

drawing current from the fuel cell to a power conditioning module;

conditioning the draw current in the power conditioning module;

applying the conditioned draw current to the system load;

measuring the draw current from the fuel cell;

defining a command signal applied to the fuel cell that sets the available output power from the fuel cell; and

defining a maximum draw current signal applied to the power conditioning module that defines the maximum draw current to be drawn from the fuel cell.

17. The method according to claim 16 wherein defining a command signal includes defining an approach threshold region, and increasing the

available output power by the command signal if the draw current enters the approach threshold region.

18. The method according to claim 17 wherein defining a command signal includes maintaining the available output power constant by the command signal if the draw current leaves the approach threshold region.

19. The method according to claim 16 wherein defining a command signal includes defining a diverge threshold region below, and decreasing the available output power by the command signal if the draw current enters the diverge threshold region.

20. The method according to claim 19 wherein defining a command signal includes maintaining the available output power constant by the command signal if the draw current leaves the diverge threshold region.

21. The method according to claim 16 further comprising measuring battery current from a battery, and increasing the available output power if the measured battery current is continuously above a predetermined amount for a predetermined period of time.

22. The method according to claim 16 further comprising measuring battery voltage from a battery, and monitoring battery voltage drift from the battery voltage.